The Role of Pronunciation-Focused Corrective Feedback in Learning Second Language Pronunciation

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ABSTRACT

This paper aims at investigating the role of pronunciation-focused corrective feedback in learning second language pronunciation. The paper provides a systematic review of teaching pronunciation by highlighting issues discussed in the literature of L2 pronunciation, such as the importance of segmental and supra-segmental features, time devoted to teaching pronunciation, and learners' first language background. It then moves to shed light on the effectiveness of corrective feedback in teaching pronunciation. This is followed by a discussion of the role of corrective feedback in teaching L2 pronunciation. After that the author presents ways in which technology can be used to provide pronunciation corrective feedback. Finally, a discussion of the different types of corrective feedback and their effectiveness is presented. The paper concludes by suggesting further research to investigate the effectiveness of different types of pronunciation-focused corrective feedback as well as the role of L2 speech technology in providing pronunciation-focused corrective feedback to L2 learners.

Keywords: L2 pronunciation, Corrective feedback, L2 speech technology, Second language acquisition, Teaching pronunciation.

INTRODUCTION

Second language speech production involves several factors that come into play when second language (L2) learners produce spoken language. These factors include the degree of mastery of different types of knowledge, such as phonological, syntactic, semantic, pragmatic, and kinesics knowledge (Flowerdew & Miller, 2005). These types of knowledge all work together to enable speakers to convey the intended meaning. However, the degree of mastery of the previously mentioned types of knowledge is in-turn affected by a number of factors, one of which is referred to as corrective feedback. Corrective feedback plays a major role in learning the above-mentioned types of knowledge in general (Gass & Mackey, 2020) and the phonological knowledge in particular (Gass & Lewis, 2007).

The role of corrective feedback in learning pronunciation did not receive a great deal of attention from researchers in the field of applied linguistics (Cucchiarini, Neri, & Strik, 2009; Saito, 2021). Therefore, due to the importance of the relationship between corrective feedback and teaching and learning pronunciation, the author decided to investigate that relationship more closely. The present paper aims to review L2 pronunciation literature in order to address the following questions:
1- What does teaching pronunciation include?
2- What is corrective feedback?
3- What is the role of corrective feedback in teaching pronunciation?
4- How can technology be used to provide pronunciation corrective feedback?
5- What type(s) of corrective feedback can be more effective?

Teaching Pronunciation

Pronunciation teaching involves teaching the sound system of the target language, which includes both segmental and supra-segmental elements. Segmental elements include vowels and consonants, whereas supra-segmental elements include stress, rhythm, and intonation. Traditional approaches to teaching pronunciation focus mainly on segmental features and give little or no attention to supra-segmental features. Current approaches to teaching pronunciation, on the contrary, give more importance to supra-segmental features (McNerney & Mendelsohn, 1992; Wang, 2020, Yenkimaleki & Heuven, 2021). Although supra-segmental features play an integral role in communicating the meaning in spoken language, English language teachers do not give them enough attention as they focus their teaching mainly around segmental features (Wang, 2020, Yenkimaleki & Heuven, 2021). Segmental features of the spoken language can be inferred from the context like "I wrote the letter with a pan" (meaning pen). Here, although the speaker pronounced *pen* as *pan*, the context of the sentence tells the hearer that the intended word was *pen*, not *pan*. On the other hand, supra-segmental

features cannot be inferred from the context, for example:

Speaker 1 (Native): John left the house.

Speaker 2 (Non-native): Where did he go? (rising intonation)

In the above example, speaker 2 wants to ask about the location of John, which requires rising-falling intonation. However, native speakers of English would interpret that as a surprise or a conformation request. Here, the context did not help in inferring the intended meaning (McNerney & Mendelsohn, 1992). The above two examples illustrate how teaching supra-segmental features is more essential than teaching segmental features.

Another issue that is related to teaching pronunciation is the time that is devoted to the actual teaching of pronunciation. In most of the cases, pronunciation teaching is embedded in listening and speaking courses. Hence, most of the class time is devoted to helping students to master different listening and speaking sub-skills and very little time is devoted to the explicit teaching of pronunciation (Cucchiarini, et al., 2009; Darcy, Rocca, & Hancock, 2021; Derwing, 2023). Therefore, teaching pronunciation requires more time in order to allow teachers to focus on both segmental and supra-segmental features and provide students with a variety of activities that would help them master different aspects of pronunciation.

Learners who come from different first language backgrounds usually have their own unique pronunciation problems (e.g., Arab speakers usually have problems with /p/ and /b/) (Avery & Ehrlich, 1992). Teachers who are familiar with their students' problematic areas can provide students with better opportunities to practice pronunciation features that address their own problems (Isaacs & Thomson, 2013).

Several studies have been conducted to investigate the effect of accent familiarity on ratings of comprehensibility, intelligibility, and accentedness of L2 speech (Bradlow & Bent, 2008; Isaacs & Thomson, 2013; Kennedy & Trofimovich, 2008; Miao, 2023; Winke, Gass, & Myford, 2011). The majority of these studies show a strong positive relationship between L2 teachers' ratings of comprehensibility, intelligibility, and accentedness of L2 speech and accent familiarity (Kahng, 2023; Park, 2020).

This shows that accent familiarity can help teachers in understanding students' L2 oral production; and hence, in providing better corrective feedback when errors occur in the classroom. This, in turn, helps students in their journey of learning the target language.

Studies related to corrective feedback have shown that pronunciation-focused corrective feedback is an important factor that helps learners in acquiring the target language pronunciation (Mackey & Gass, 2006; Saito, 2021). The next section will deal with corrective feedback and its role in teaching pronunciation.

Corrective Feedback and Teaching Pronunciation

Second language pronunciation teaching had witnessed varying degrees of attention during the last few decades (Derwing, 2023; Derwing & Munro, 2015; Isaacs, 2009). During the dominance of the structural approach to L2 teaching, the audio-lingual approach promoted accuracy over fluency in pronunciation instruction through emphasizing repetition and mimicry in order to overcome the effect of L1 interference on L2 pronunciation (Lightbown & Spada, 2021). In a later stage, and with the advent of communicative language teaching, the attention shifted from accuracy to fluency in pronunciation teaching (Derwing & Munro, 2015; Isaacs, 2009; Pennington, 2021). This shift lead to limited attention to pronunciation teaching due to the dominance of the belief holding that L2 learning is best achieved through exposing learners to comprehensible input that will result in an automatic learning of pronunciation. This dominance of relying on comprehensible input was supported by Krashen's Monitor Model (Krashen, 1985), which influenced the way in which educators viewed L2 learning. As a result, pronunciation teaching suffered from negligence (Celce-Murcia, Brinton, Goodwin, & Griner 2010; Saito, 2012), which was reflected in limited pronunciation teaching resources (Grant, 1995) as well as limited attention to pronunciation in teacher preparation programs (Derwing, 2023; Derwing & Munro, 2015).

However, by the mid-1980s, pronunciation teaching has regained the attention of L2 researchers and educators (Isaacs, 2009), who came to realize the central role of pronunciation in successful L2 communication (Derwing & Munro, 2015; Morley, 1991). This renewed attention to pronunciation teaching came with a view that called for more balance between fluency and accuracy. As Lightbown and Spada (1990) suggested, "accuracy, fluency, and overall communicative skills are probably best developed through instruction that is primarily meaning-based but in which guidance is provided through timely form-focused activities and correction in context" (p.443). The form-focused instruction referred to by Lightnown and Spada (1990) can be defined as "any pedagogical effort which is used to draw the learners' attention to language form either implicitly or explicitly" (Spada, 1997:73). Form-focused instruction can take the form of corrective feedback (Lyster, 1998), which has been shown as an effective technique in maximizing L2 learning outcomes (Gass & Mackey, 2020).

Lightbown and Spada (2021) define corrective feedback as "an indication to a learner that his or her use of the target language is incorrect" (p. 458). Corrective feedback helps learners in noticing their errors which, with repeated practice, helps them to reach a certain threshold in which they make form-meaning mapping that result in the acquisition of a given language element (Ellis & Wulff, 2020). This shows that corrective feedback can

serve as an important element to aid the acquisition of pronunciation features (i.e., phonological knowledge). However, providing too much corrective feedback to students may lower students' self-confidence if they are corrected every time they commit a mistake. One solution to get around this problem is that not all errors should be corrected immediately. That is, only errors that affect the intelligibility of the message should be corrected in a way that does not affect students' self-confidence (Burleson, 2007; Engwall & Bälter, 2007). However, this solution is time consuming and difficult to achieve, especially in certain English as a Foreign Language (EFL) settings where classes contain large number of students.

Another solution that is discussed in the literature is the use of Computer-Assisted Pronunciation Training (CAPT) as a means for providing pronunciation-focused corrective feedback. Two CAPT tools have been suggested to be effective in providing pronunciation-focused corrective feedback: Automatic Speech Recognition (ASR) and Text-to-Speech Synthesis (TTS) (Bajorek, 2017; Burleson, 2007; Cucchiarini, et al., 2009; Engwall & Bälter, 2007; Hincks, 2003; Mroz, 2020; Neri, Cucchiarini, & Strik, 2008; Liakina & Liakin, 2023).

Automatic Speech Recognition (ASR) is a computing process that instantly transcribes spoken language into text. In pronunciation instruction contexts, researchers propose using ASR as a tool to teach L2 pronunciation and to provide feedback on students' oral production (Liakin, Cardoso, & Liakina, 2015; McCrocklin, 2014). ASR has two major applications in second language pronunciation teaching: (1) to teach the pronunciation of a foreign language; and (2) to assess students' oral production (Garcia, Nickolai, & Jones, 2020; Liakina & Liakin, 2023).

Text-to-Speech Synthesis (TTS) is a natural-language modeling process that changes units of text into audio speech presentation. Text-to-speech programs usually provide several features including different voice speed levels (speech output), male and female speakers with different pitches (low and high), different accents, and a highlight function that displays the words, sentences, and paragraphs being read by the program (Liakina & Liakin, 2023).

CAPT can be used to encourage practice and repetition (Chapelle and Jamieson, 2008; Garcia, Nickolai, & Jones, 2020; McCrocklin, 2014), which can lead to a personalized learning experience (Derwing, 2010; Tsutsui, 2004). CAPT can also provide immediate feedback on pronunciation (Mroz, 2018; Neri, Cucchiarini, Strick, & Boves, 2002; Neri, Cucchiarini, & Strik, 2008; Wang and Young, 2015), and can encourage learner autonomy (Bozorgian & Shamsi, 2020; Chapelle & Jamieson, 2008; McCrocklin, 2014).

CAPT represents a major shift in teaching pronunciation around the world because in the past, computers were used merely as recording devices that play back what students say without giving any kind of feedback (Hincks, 2003). The use of this technology can make pronunciation corrective feedback effective in two ways. First, it can provide as much feedback as required for each individual student. Second, as the feedback is provided privately for each individual student, students' self-confidence in not usually affected.

Although CAPT technology is still relatively new, research findings provide evidence that it provides effective pronunciation feedback for students that lead to significant improvements in their pronunciation.

Ngo, Chen, and Lai (2023) conducted a meta-analytic investigation. Their primary objective was to assess the general efficacy of automatic speech recognition (ASR) in improving the pronunciation performance of ESL/EFL students. By examining data from 15 studies encompassing a total of 38 effect sizes collected between 2008 and 2021, the researchers conducted a comprehensive meta-analysis. The results of this meta-analysis revealed a moderate overall effect size (g=0.69) for ASR, indicating its impact on enhancing pronunciation skills.

The findings of the above study indicated the following: (1) Explicit corrective feedback in ASR is highly effective, while indirect feedback (such as ASR dictation) shows moderate effectiveness. (2) ASR significantly improves segmental features of pronunciation but has a minimal impact on suprasegmental features of pronunciation. (3) Longer treatment durations of ASR lead to better learning outcomes, whereas short durations do not differ significantly from a non-ASR condition. (4) Collaborative practice with peers in an ASR setting has a substantial impact, whereas practicing alone has a minor effect. (5) ASR is highly effective for adult learners (aged 18 and above) and intermediate English learners. The authors concluded that ASR is a valuable tool for enhancing L2 student pronunciation and is recommended for use in instructional settings.

Bozorgian and Shamsi (2020) investigated the extent to which (CAPT) improved five Iranian English as Foreign Language (EFL) learners' use of suprasegmental features. Their study utilized The My English Tutor (MyET) computer software to train the five Language learners for using suprasegmental features of English pronunciation (e.g., stress, rhythm/timing, and intonation). Data collected for their study included direct observation reports for a two-month period, reflective notes from researcheres and participants, feedback and scores provided by MyET, and oral interviews that were conducted and analyzed. The results revealed that CAPT improved EFL learners' use of second language suprasegmental features. Moreover, the oral interview analyses showed that EFL learners had a positive attitude toward CAPT, which assisted them to become more autonomous and confident in learning second language pronunciation.

Mroz (2022) investigated whether and how Speech-To-Text (STT) and Text-To-Speech technology (TTS) used in Gmail on smartphones are differentially beneficial to learners of French enrolled in two distinct forms of instruction targeting an advanced level of proficiency and intelligibility. Results showed that the utilization of Text-to-Speech in conjunction with Speech-to-Text has been found to be the most advantageous form of speech technology, resulting in significant improvements in both skill level and clarity when compared to the absence of speech technology. The combined approach of Text-to-Speech and Speech-to-Text facilitates a two-way process that reinforces the primary oral skill emphasized by each instructional method. Furthermore, it enables students to actively and independently focus on a skill that was only occasionally integrated into their curriculum. The author concluded that this combined use of speech technology enhances learning outcomes and promotes growth in both oral proficiency and student autonomy.

Cucchiarini et al. (2009) investigated the effectiveness of ASR-based corrective feedback on improving Dutch L2 learners' pronunciation. They concluded that although CAPT did not achieve100% accuracy in error detection, it helped learners to achieve significant developments in their pronunciation in the period of one month.

Engwall and Bälter (2007) conducted interviews with language teachers and students about their attitudes toward corrective feedback in the actual classroom environment. They also observed how corrective feedback is given in actual classrooms. They used the data that they collected from actual classrooms in developing a computer-animated language tutor giving pronunciation feedback. The virtual tutor was evaluated with a questionnaire, which reveled that the corrective feedback given through human teacher-learner interaction was more effective than feedback provided by the virtual tutor in improving students' pronunciation.

Neri, Cucchiarini, and Strik, (2008) conducted an experimental study to measure the effectiveness of ASR-based CAPT system in providing feedback on Dutch phonemes that are problematic for adult learners of Dutch. The study compared the performance of three groups: the first used an ASR-based CAPT system that provides automatic feedback, the second group used a CAPT system that does not provide feedback, and the third group did not use a CAPT system at all. Results indicated that the group that used the ASR-based CAPT system that provides automatic feedback made the largest mean improvement in the pronunciation of the target Dutch phonemes.

Hincks (2003) conducted a study to investigate whether unlimited access to speech-recognition-based language learning program can improve the pronunciation of a group of English language learners in Sweden. The experimental group was given access to software called "talk to me", whereas the control group did not have access to the software. Both groups were pre- and post-tested with the automatic phonePass SET-10 test from Ordinate Corp. Results indicated that the use of the software was beneficial for those who began the program with a heavy accent but was with limited value for those who began the program with better pronunciation.

The above studies illustrate the effectiveness of CAPT technology in providing pronunciation-focused corrective feedback for different cohorts of learners. However, as this area is still relatively new, it requires future research.

From the above studies we can reach the following conclusions:

1- It is clear that ASR-based CAPT software still need more development as it is only able to provide corrective feedback on limited number of pronunciation errors.
2- ASR-based CAPT is more useful for learners at the beginning stages in terms of pronunciation as indicated by Hincks (2003).
3- ASR significantly improves segmental features of pronunciation but has a minimal impact on suprasegmental features of pronunciation as indicated by Ngo, Chen, and Lai (2023)
4- CAPT software can only be used as a supplement to classroom teaching, not as a replacement for actual teaching since it is only able to detect a limited number of errors.
5- ASR-based CAPT is not always a successful way of providing corrective pronunciation feedback as indicated by Engwall and Bälter (2007).
6- Using Speech-To-Text (STT) in combination with Text-To-Speech technology (TTS) leads to significant improvements in both skill level and clarity when compared to the absence of speech technology.
7- None of the studies compared the effectiveness of SST/TTS to ASR in providing pronunciation corrective feedback.

The effectiveness of corrective feedback does not only depend on the amount of feedback provided but also on the type of feedback that is provided to students. The following section investigates the effectiveness of different types of feedback.

Types of Corrective Feedback
Research has recently been directed towards understanding the different types and components of corrective feedback (Mackey, 2007; Martin & Sippel, 2021). Two types of feedback are identified: implicit and explicit. Implicit feedback includes clarification requests, confirmation checks, repetitions, and recasts. Explicit feedback

includes corrections and meta-linguistic explanations (Harmer, 2015; Li, & Vuono, 2019; Lyster & Mori, 2006; Nguyen & Llinares, 2023; Oliver & Adams, 2021).

Macheak (2001) differentiates between four types of feedback and identifies the components of each type. The first type is positive feedback which usually occurs after a correct response to indicate that it is correct (e.g., good job). The second type is negative feedback which follows an incorrect response to indicate that it is incorrect (e.g., we do not pronounce the /k/ sound at the beginning of the word "know"). The third type is direct feedback which explicitly indicates that an error has occurred (e.g., not correct, try again please). The last type is indirect feedback in which students have to infer that they have produced a target-like or non-target-like pronunciation (e.g., is that correct?).

Among the different types of corrective feedback, several research findings show that explicit feedback is the most commonly used and that it leads to the best uptake (Arianto, 2019; Lyster, 1998; Lyster & Mori, 2006; Sheen, 2004). However, the effectiveness of a specific type of corrective feedback is a controversial issue, as it depends on many factors including learner individual differences, motivation, age, first language background, and proficiency level in the target language, just to name a few. Therefore, different research results have come to different conclusions of the type of effective corrective feedback which makes this question open to further research (Arianto, 2019; Engwall & Bälter, 2007).

CONCLUSION

The above discussion shows both the importance of providing corrective feedback for pronunciation errors and the complexity of the problems associated with it. The discussion also provides an overview of the use of ASR-based as well as STT-based CAPT software as a possible solution for providing corrective feedback for pronunciation errors and points out the limitations of using CAPT. Then the different types of feedback are explored. However, the question of what the most effective feedback type is remains unanswered as it requires further research. Finally, the effectiveness of utilizing CAPT as a tool to provide pronunciation-focused corrective feedback to L2 learners needs further investigation.

REFERENCES

1. Arianto, R. O. (2019). Corrective Feedback on Pronunciation Errors: Teacher's Perception and EFL High School Students' Self-Reflection. Journal of English Education and Teaching, 3(4), 413-428. https://doi.org/10.33369/jeet.3.4.413-428
2. Avery, P., & Ehrlich, D. (1992) Problems of selected language groups. In P. Avery & S. Ehrlich (Eds.), Teaching American English pronunciation (pp. 111-157). Oxford: Oxford University Press.
3. Bajorek, J. P. (2017). L2 Pronunciation in CALL: The Unrealized Potential of Rosetta Stone, Duolingo, Babbel, and Mango Languages. Issues and Trends in Educational Technology, 5(1), 24-51.
4. Bozorgian, H., & Shamsi, E. (2020). Computer-assisted pronunciation training on Iranian EFL learners' use of suprasegmental features: A case study. Computer-Assisted Language Learning Electronic Journal, 21(1), 93-113.
5. Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. Cognition, 106(2), 707-729. https://doi.org/10.1016/j.cognition.2007.04.005
6. Burleson, D. F. (2007). Improving intelligibility of non-native speech with computer- assisted phonological training. IULC Working Papers, 7, [n.p.].
7. Celce-Murcia, M., Brinton, D. M., Goodwin, J. M., & Griner, B. (2010). Teaching pronunciation: A course book and reference guide. Cambridge University Press.
8. Chapelle, C., & Jamieson, J. (2008). Tips for teaching with CALL: Practical approaches to computer-assisted language learning. Pearson Education.
9. Cucchiarini, C., Neri, A., & Strik, H. (2009). Oral proficiency training in Dutch L2: The contribution of ASR-based corrective feedback. Speech Communication, 51(10), 853-863. https://doi.org/10.1016/j.specom.2009.03.003
10. Darcy, I., Rocca, B., & Hancock, Z. (2021). A window into the classroom: How teachers integrate pronunciation instruction. RELC Journal, 52(1), 110-127. https://doi.org/10.1177/0033688220964269
11. Derwing, T. M., & Munro, M. J. (2015). Pronunciation fundamentals: evidence-based perspectives for L2 teaching and research. Amsterdam: John Benjamins Publishing Company. https://doi.org/10.1075/lllt.42
12. Derwing, T. M. (2010). Utopian goals for pronunciation teaching. In J. Levis & K. LeVelle (Eds.), Proceedings of the 1st Pronunciation in Second Language Learning and Teaching Conference, Iowa State University, Sept. 2009. (pp. 24-37), Ames, IA: Iowa State University.

13. Derwing, T. M. (2023). An overview of pronunciation teaching and training. In U. K. Alves, & J. I. A de Albuquerque (Eds.), Second Language Pronunciation: Different Approaches to Teaching and Training. (pp. 287-312). De Gruyter Mouton. https://doi.org/10.1515/9783110736120-015

14. Ellis, N. & Wulff, S. (2020). Usage-based approaches to L2 acquisition. In B. VanPatten, G. D. Keating, & S. Wulff (Eds.), Theories in second language acquisition: An introduction. (pp. 63-82). Routledge. https://doi.org/10.1515/9783110736120

15. Engwall, O., & Bälter, O. (2007). Pronunciation feedback from real and virtual language teachers. Computer Assisted Language Learning, 20(3), 235-262. https://doi.org/10.1080/09588220701489507

16. Flowerdew, J., & Miller, L. (2005). Second language listening: Theory and practice. New York: Cambridge University Press.

17. Garcia, C., Nickolai, D., & Jones, L. (2020). Traditional versus ASR-based pronunciation instruction: An empirical study. Calico Journal, 37(3), 213-232. https://doi.org/10.1558/cj.40379

18. Gass, S., & Lewis, K. (2007). Perceptions about interactional feedback: Differences between heritage language learners and non-heritage language learners. In A. Mackey (Ed.), Conversational interaction in second language acquisition (pp. 79-99). New York: Oxford University Press.

19. Gass, S., & Mackey, A. (2020). Input, interaction, and output in L2 acquisition. In B. VanPatten, G. D. Keating, & S. Wulff (Eds.), Theories in second language acquisition: An introduction. (pp. 192-222). Routledge. https://doi.org/10.4324/9780429503986-9

20. Grant, L. (1995). Creating pronunciation-based ESL materials for publication. In P. Byrd (Ed.), Material writer's guide (pp. 107-123). Boston, MA: Heinle & Heinle.

21. Harmer, J. (2015). The practice of English language teaching 5th ed. England: Pearson Education Limited.

22. Hincks, R. (2003). Speech technologies for pronunciation feedback and evaluation. ReCALL, 15(1), 3-20. https://doi.org/10.1017/s0958344003000211

23. Isaacs, T., & Thomson, R. I. (2013). Rater experience, rating scale length, and judgments of L2 pronunciation: Revisiting research conventions. Language Assessment Quarterly, 10(2), 135-159. https://doi.org/10.1080/15434303.2013.769545

24. Isaacs, T. (2009). Integrating form and meaning in L2 pronunciation instruction. TESL Canada Journal, 27(1), 1-12. https://doi.org/10.18806/tesl.v27i1.1034

25. Kahng, J. (2023). Exploring Individual Differences in Rating Second Language Speech: Rater's Language Aptitude, Major, Accent Familiarity, and Attitudes. TESOL Quarterly. https://doi.org/10.1002/tesq.3217

26. Kennedy, S., & Trofimovich, P. (2008). Intelligibility, comprehensibility, and accentedness of L2 speech: The role of listener experience and semantic context. Canadian Modern Language Review, 64(3), 459-489. https://doi.org/10.3138/cmlr.64.3.459

27. Krashen, S. D. (1985). The input hypothesis: Issues and implications. London: Longman.

28. Li, S., & Vuono, A. (2019). Twenty-five years of research on oral and written corrective feedback in System. System, 84, 93-109. https://doi.org/10.1016/j.system.2019.05.006

29. Liakin, D., Cardoso, W., & Liakina, N. (2015). Learning L2 pronunciation with a mobile speech recognizer: French/y/. Calico Journal, 32(1), 1-25. https://doi.org/10.1558/cj.v32i1.25962

30. Liakina, N., & Liakin, D. (2023). Speech technologies and pronunciation training: What is the potential for efficient corrective feedback?. In U. K. Alves, & J. I. A de Albuquerque (Eds.), Second Language Pronunciation: Different Approaches to Teaching and Training. (pp. 287-312). De Gruyter Mouton.

31. https://doi.org/10.1515/9783110736120-011

32. Lightbown, P. M, & Spada, N. (2021). How languages are learned (5th. Ed.) . Oxford: Oxford University Press.

33. Lightbown, P., & Spada, N. (1990). Focus on form and corrective feedback in communicative language teaching. Studies in Second Language Acquisition, 12(4), 429-448. https://doi.org/10.1017/s0272263100009517

34. Lyster, R., & Mori, H. (2006). Interactional feedback and instructional counterbalance. Studies in second language acquisition, 28(2), 269-300. https://doi.org/10.1017/s0272263106060128

35. Lyster, R. (1998). Negotiation of form, recasts, and explicit correction in relation to error types and learner repair in immersion classrooms. Language Learning, 48(2), 183-218.

https://doi.org/10.1111/j.1467-1770.2001.tb00019.x

36. Macheak, T. E. (2001). Corrective feedback in second language acquisition: Towards an integrated model. Selected Proceedings of the Second Language Research Forum, 229-248.

37. Mackey, A., & Gass, S. (2006). Pushing the methodological boundaries in interaction research: Introduction. Studies in second language acquisition, 28, 78-69.

38. Mackey, A. (2007). Introduction: The role of conversational interaction in second language acquisition. In A. Mackey (Ed.), Conversational interaction in second language acquisition (pp. 1-26). New York: Oxford University Press.

39. Martin, I. A., & Sippel, L. (2021). Is giving better than receiving?: The effects of peer and teacher feedback on L2 pronunciation skills. Journal of Second Language Pronunciation, 7(1), 62-88. https://doi.org/10.1075/jslp.20001.mar

40. McCrocklin, S. M. (2014). The potential of Automatic Speech Recognition for fostering pronunciation learners' autonomy (Doctoral dissertation, Iowa State University). https://doi.org/10.31274/etd-180810-3328

41. McNerney, M., & Mendelsohn, D. (1992) Suprasegmentals in the pronunciation class: Setting priorities. In P. Avery & S. Ehrlich (Eds.), Teaching American English pronunciation (pp. 185-196). Oxford: Oxford University Press.

42. Miao, Y. (2023). The relationship among accent familiarity, shared L1, and comprehensibility: A path analysis perspective. Language Testing, 40(3). https://doi.org/10.1177/02655322231156105

43. Morley, J. (1991). The pronunciation component in teaching English to speakers of other languages. TESOL Quarterly, 25(3), 481-520. https://doi.org/10.2307/3586981

44. Mroz, A. P. (2022). Integrating Mobile-Based Text-To-Speech (TTS) and Speech-To-Text (STT) to Advance Proficiency and Intelligibility in French. In S. McCrocklin "Technological Resources for Second Language Pronunciation Learning and Teaching: Research-based Approaches", 147-169.

45. Mroz, A. (2020). Aiming for advanced intelligibility and proficiency using mobile ASR. Journal of Second Language Pronunciation, 6(1), 12-38. https://doi.org/10.1075/jslp.18030.mro

46. Mroz, A. (2018). Seeing how people hear you: French learners experiencing intelligibility

47. through automatic speech recognition. Foreign Language Annals, 51(3), 617-637.

48. https://doi.org/10.1111/flan.12348

49. Neri, A., Cucchiarini, C., & Strik, H. (2008). The effectiveness of computer-based speech corrective feedback for improving segmental quality in L2 in Dutch. ReCALL, 20(2), 225-243. https://doi.org/10.1017/s0958344008000724

50. Neri, A., Cucchiarini, C., Strik, H., & Boves, L. (2002). The pedagogy-technology interface in computer assisted pronunciation training. Computer assisted language learning, 15(5), 441-467. https://doi.org/10.1076/call.15.5.441.13473

51. Ngo, T. T. N., Chen, H. H. J., & Lai, K. K. W. (2023). The effectiveness of automatic speech recognition in ESL/EFL pronunciation: A meta-analysis. ReCALL, 1-18. https://doi.org/10.1017/s0958344023000113

52. Nguyen, T., & Llinares, A. (2023). CLIL in Spain and Vietnam: Different contexts, different patterns of corrective feedback. Journal of Immersion and Content-Based Language Education. https://doi.org/10.1075/jicb.21014.ngu

53. Oliver, R., & Adams, R. (2021). Oral corrective feedback. In H. Nassaji, & E. Kartchava

54. (Eds.), The Cambridge handbook of corrective feedback in second language learning and

55. teaching (pp. 187–206). Cambridge University Press. https://doi.org/10.1017/9781108589789.010

56. Park, M. S. (2020). Rater effects on L2 oral assessment: focusing on accent familiarity of L2 teachers. Language Assessment Quarterly, 17(3), 231-243. https://doi.org/10.1080/15434303.2020.1731752

57. Pennington, M. C. (2021). Teaching pronunciation: The state-of-the-art 2021. RELC Journal, 52(1), 3-21. https://doi.org/10.1177/00336882211002283

58. Saito, K. (2012). Effects of instruction on L2 pronunciation development: A synthesis of 15 quasi-experimental intervention studies. TESOL Quarterly, 46(4), 842-854. https://doi.org/10.1002/tesq.67

59. Saito, K. (2021). Effects of corrective feedback on second language pronunciation development. In H. Nassaji & E. Kartchava (Eds.), The Cambridge handbook of corrective feedback in language learning and teaching (407-428). Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/9781108589789.020

60. Sheen, Y. H. (2004). Corrective feedback and learner uptake in communicative classrooms across instructional settings. Language Teaching Research, 8, 263-300. https://doi.org/10.1191/1362168804lr146oa

61. Spada, N. (1997). Form-focussed instruction and second language acquisition: A review of

62. classroom and laboratory research. Language Teaching, 30(02), 73-87. https://doi.org/10.1017/s0261444800012799

63. Tsutsui, M. (2004). Multimedia as a means to enhance feedback. Computer Assisted Language Learning, 17(3-4), 377-402. https://doi.org/10.1080/0958822042000319638

64. Wang, Y. H., & Young, S. C. (2015). Effectiveness of feedback for enhancing English pronunciation in an ASR-based CALL system. Journal of Computer Assisted Learning, 31(6), 493-504. https://doi.org/10.1111/jcal.12079

65. Wang, X. (2020). Segmental versus suprasegmental: Which one is more important to teach?. RELC Journal, 53(1), 194-202. https://doi.org/10.1177/0033688220925926

66. Winke, P., Gass, S. M., & Myford, C. (2011). The relationship between raters' prior language study and the evaluation of foreign language speech samples. Princeton, NJ: Educational Testing Service. https://doi.org/10.1002/j.2333-8504.2011.tb02266.x

67. Yenkimaleki, M., & Heuven, V. J. J. P. van. (2021). Effects of attention to segmental vs. suprasegmental features on the speech intelligibility and comprehensibility of the EFL learners targeting the perception or production-focused practice. System. 100, 102557. https://doi.org/10.1016/j.system.2021.102557